CLAIMS

1. A sulfenyl compound represented by the general formula:

R-S-X (I)

(wherein R represents an organic group having at least one constituent element labeled with an isotope, and X represents a leaving group).

2. The sulfenyl compound according to claim 1, wherein the organic group R comprises C, H, and N, and optionally O and/or P as the constituent element, and the isotope is a stable isotope selected from the group consisting of ^{2}H, ^{13}C, ^{15}N, ^{17}O, and ^{18}O.

3. The sulfenyl compound according to claim 1, wherein a molecular weight of the sulfenyl compound is larger than the molecular weight of a compound, which has the same structure as the compound and does not labeled with the isotope, by 3 to 12.

4. The sulfenyl compound according to claim 1, wherein the number of the constituent element labeled with the isotope is 3 or more.

5. The sulfenyl compound according to claim 1, wherein the organic functional group R is an alkyl group which may be substituted or an aryl group which may be substituted.

6. The sulfenyl compound according to claim 5, wherein a substituent of the alkyl group which may be substituted is selected from the group consisting of NO_2, COOH, SO_3H, OH, alkoxyl, aryl, and aryloxy.

7. The sulfenyl compound according to claim 5, wherein a substituent of the aryl group which may be substituted is selected from the group consisting of NO_2, COOH, SO_3H, OH, alkyl, alkoxyl, aryl, and aryloxy.

8. The sulfenyl compound according to claim 5, wherein the organic group R is a phenyl group which may be substituted.

9. The sulfenyl compound according to claim 1, wherein the leaving group X is a halogen atom.

10. The sulfenyl compound according to claim 1, selected from the group consisting of 2-nitro[$^{13}C_6$] benzenesulfenyl chloride, 4-nitro[$^{13}C_6$] benzenesulfenyl chloride, 2, 4-dinitro[$^{13}C_6$] benzenesulfenyl chloride, and 2-nitro-4-carboxy[$^{13}C_6$] benzenesulfenyl chloride.

11. A labeling reagent comprising a sulfenyl compound represented by the general formula:

$$R\text{-}S\text{-}X \qquad (I)$$

(wherein R represents an organic group having at least one constituent element labeled with an isotope, and X represents a leaving group).

12. The labeling reagent according to claim 11,

wherein the organic group R comprises C, H, and N, and optionally O and/or P as the constituent element, and the isotope is a stable isotope selected from the group consisting of ^{2}H, ^{13}C, ^{15}N, ^{17}O, and ^{18}O.

13. The labeling reagent according to claim 11, wherein a molecular weight of the sulfenyl compound is larger than the molecular weight of a compound, which has the same structure as the compound and does not labeled with the isotope, by 3 to 12.

14. The labeling reagent according to claim 11, wherein the number of the constituent element labeled with the isotope is 3 or more.

15. The labeling reagent according to claim 11, wherein the organic functional group R is an alkyl group which may be substituted or an aryl group which may be substituted.

16. The labeling reagent according to claim 15, wherein a substituent of the alkyl group which may be substituted is selected from the group consisting of NO_2, COOH, SO_3H, OH, alkoxyl, aryl, and aryloxy.

17. The labeling reagent according to claim 15, wherein a substituent of the aryl group which may be substituted is selected from the group consisting of NO_2, COOH, SO_3H, OH, alkyl, alkoxyl, aryl, and aryloxy.

18. The labeling reagent according to claim 15,

wherein the organic group R is a phenyl group which may be substituted.

19. The labeling reagent according to claim 11, wherein the leaving group X is a halogen atom.

20. The labeling reagent according to claim 11, wherein the sulfenyl compound is selected from the group consisting of 2-nitro[$^{13}C_6$] benzenesulfenyl chloride, 4-nitro[$^{13}C_6$] benzenesulfenyl chloride, 2, 4-dinitro[$^{13}C_6$] benzenesulfenyl chloride, and 2-nitro-4-carboxy[$^{13}C_6$] benzenesulfenyl chloride.

21. The labeling reagent according to claim 11, in a use for peptide analysis.

22. The labeling reagent according to claim 11, separately including each of:

one compound selected from the sulfenyl compounds, and

a compound (light reagent) which has the same structure as the selected one compound (heavy reagent) and does not labeled with the isotope.

23. A method of analyzing peptide, using a labeling reagent comprising a sulfenyl compound represented by the general formula:

R-S-X (I)

(wherein R represents an organic group having at least one constituent element labeled with an isotope, and X represents a leaving group).

24. The method of analyzing peptide according to claim 23, wherein the organic group R comprises C, H, and N, and optionally O and/or P as the constituent element, and the isotope is a stable isotope selected from the group consisting of ^{2}H, ^{13}C, ^{15}N, ^{17}O, and ^{18}O.

25. The method of analyzing peptide according to claim 23, wherein a molecular weight of the sulfenyl compound is larger than the molecular weight of a compound, which has the same structure as the compound and does not labeled with the isotope, by 3 to 12.

26. The method of analyzing peptide according to claim 23, wherein the number of the constituent element labeled with the isotope is 3 or more.

27. The method of analyzing peptide according to claim 23, wherein the organic functional group R is an alkyl group which may be substituted or an aryl group which may be substituted.

28. The method of analyzing peptide according to claim 27, wherein a substituent of the alkyl group which may be substituted is selected from the group consisting of NO_2, COOH, SO_3H, OH, alkoxyl, aryl, and aryloxy.

29. The method of analyzing peptide according to claim 27, wherein a substituent of the aryl group which may be substituted is selected from the group consisting of NO_2, COOH, SO_3H, OH, alkyl, alkoxyl, aryl, and aryloxy.

30. The method of analyzing peptide according to claim 27, wherein the organic group R is a phenyl group which may be substituted.

31. The method of analyzing peptide according to claim 23, wherein the leaving group X is a halogen atom.

32. The method of analyzing peptide according to claim 23, wherein the isotope-labeled sulfenyl compound of the formula (I) is selected from the group consisting of 2-nitro[$^{13}C_6$] benzenesulfenyl chloride, 4-nitro[$^{13}C_6$] benzenesulfenyl chloride, 2, 4-dinitro[$^{13}C_6$] benzenesulfenyl chloride, and 2-nitro-4-carboxy[$^{13}C_6$] benzenesulfenyl chloride.

33. The method of analyzing peptide according to claim 23, wherein the labeling reagent separately including each of:

one compound selected from the sulfenyl compounds, and

a compound (light reagent) which has the same structure as the selected one compound (heavy reagent) and does not labeled with the isotope.

34. The method of analyzing peptide according to claim 23, comprising labeling an amino acid residue of a peptide of interest by using the labeling reagent, and subjecting the resulting labeled peptide to mass spectrometry measurement.

35. The method of analyzing peptide according to

claim 34, comprising:

(i) labeling the peptide of interest with either one of: one compound (heavy reagent) selected from the sulfenyl compounds; and a compound (light reagent) which has the same structure as the selected one compound and does not labeled with the isotope, to thereby obtain the labeled peptide of interest;

(ii) separately labeling a control peptide with the other of the heavy reagent and the light reagent to thereby obtain the labeled control peptide;

(iii) mixing the labeled peptide of interest obtained in (i) with the labeled controlled peptide obtained in (ii); and

(iv) subjecting the mixed labeled peptides to mass spectrometry measurement.

36. The method of analyzing peptide according to claim 34, optionally comprising enzymatic digestion and/or a chemical treatment comprising reduction and alkylation.

37. The method of analyzing peptide according to claim 36, wherein the enzymatic digestion is carried out before or after the labeling.

38. The method of analyzing peptide according to claim 36, wherein the chemical treatment is carried out before or after the labeling.

39. The method of analyzing peptide according to claim 36, wherein the chemical treatment, the enzymatic digestion, and the labeling are carried out in this order.

40. The method of analyzing peptide according to claim 36, wherein the chemical treatment, the labeling, and the enzymatic digestion are carried out in this order.

41. The method of analyzing peptide according to claim 36, wherein the labeling, the chemical treatment, and the enzymatic digestion are carried out in this order.

42. The method of analyzing peptide according to claim 34, comprising, after the labeling, optionally purifying the labeled peptide including separation by gel filtration and separation on a reversed-phase column.

43. The method of analyzing peptide according to claim 34, wherein the amino acid residue is tryptophan residue.

44. A novel compound comprising a peptide detected by the method of analyzing peptide according to claim 23.

45. A compound as a candidate for a potential pharmaceutical product comprising a peptide detected by the method of analyzing peptide according to claim 23.